

PATENT SPECIFICATION

345,492



Application Date: March 21, 1930. No. 9155 / 30.

Complete Left: Nov. 7, 1930.

Complete Accepted: March 26, 1931.

PROVISIONAL SPECIFICATION.

Improvements in or relating to Plug and Socket Devices for Connecting Mains-operated Wireless Sets and the like to Mains.

We, BELLING & LEE, LIMITED, a Company incorporated according to British Law, of Queensway Works, Ponders End, in the County of Middlesex, and EDGAR MORTON LEE, a British Subject, of the same address, do hereby declare the nature of this invention to be as follows:

This invention relates to plug and socket devices for use in connection with electrical apparatus and in particular, mains-operated wireless sets and the like of the kind in which provision is made for alternative use of the apparatus or set with either of two or more mains voltages. The invention has for its principal object to provide an improved construction of plug and socket device for connecting such sets to the mains whereby the possibility of inserting the plug so that high voltage mains are connected to the lower voltage input circuit of the set, and vice versa, is obviated.

According to the present invention, the respective part of the plug and socket device connected to the set is provided with three contact members one of which is common to both high and low voltage input circuits, while the other two contact members are connected to the respective different voltage circuits, and the co-operating part of the device connected to the mains is provided with two contact members adapted to engage respectively with the common contact member and with one of the different voltage contact members. In the other part, one or both of the parts of the plug and socket device being constructed so that structural alteration or adjustment, such as the removal or change in position of a screw or other contact or obstructing member in one of the co-operating parts of the device, is necessary to enable the part connected to the mains to be applied to the part connected to the set so as to engage the other of the different voltage contact members.

In carrying the invention into effect according to one construction, the [Price 1/-].

improved plug and socket connecting device comprises an elongated base member of insulating material, preferably of rectangular formation externally and formed with a longitudinal recess open at one side of the base member, the opposite side being formed with holes for the reception of three plug contact members, the contact portions of which are accommodated in the recess in the base member and are thereby shrouded. At each end the base member may be formed with two holes extending transversely through the base member at right angles to one another so that the base member may be fixed so as to project from the outer face of a panel, or behind a panel, in which case the panel is formed with a slot coinciding with the longitudinal recess in the base member, or upon a base-board with the contact plugs horizontally disposed. One of the three contact members, conveniently at one end, is common to both the voltage input circuits of the set, while the remaining two terminals are connected respectively to the different voltage circuits.

For co-operation with the base member, an insulated plug member is provided having a portion shaped to fit into the elongated recess in the base member. The insulated plug member conveniently is split in a longitudinal plane along the major axis of its cross-section, the two parts being held together by means of a screw or screws and being formed with an inlet passage for the flex connected to the mains, such inlet passage communicating with branch passages leading to three parallel disposed recesses corresponding in position to the three plug contacts in the base member, such parallel recesses having enlarged intermediate portions adapted for the reception of metal sockets for engaging with the plug contacts. Only two such sockets are provided, one socket being disposed permanently in the recess at one end of the insulated plug

55

60

65

70

75

80

85

90

95

100

member, while the other socket is inserted as desired into one or other of the remaining recesses according to the mains voltage with which the set is to be used. It will be appreciated that once the variable metal socket is inserted into the correct recess and the two halves of the insulated plug member are screwed together, it is impossible to connect the mains to the wrong voltage input circuit of the set. In order to prevent the insulated plug member from being turned round end to end and inserted so as possibly to make the wrong connection the three plug contacts in the base member are unequally spaced from one another. Alternatively, the contact members may be equally spaced and the elongated recess in the base member may be formed with a recess or a projection co-operating with a corresponding recess or projection upon or in the insulated plug member, the co-operating recess or projection being so arranged that the insulating plug member cannot be inserted the wrong way round.

In an alternative construction, the three contact members in the base member are symmetrically spaced and the centre contact is common to the two voltage circuits. The centre contact member is provided or formed with a plug contact projecting into a recess in the base member, while the two outer contact members are formed at their inner ends with screw-threaded sockets or the like adapted for the alternative reception of a plug contact member having a screw-threaded base portion. For use with this construction of base member, a two-pin socket coupling of ordinary construction may be utilised, it being obvious that once the position of the movable plug contact has been determined, the two-pin socket coupling cannot be inserted to make connection with the wrong input circuit, the conducting sockets in such plug member being suitably shrouded so that there is no possibility of contact with the screwed socket of the idle contact member in the base member.

In a further alternative construction, both the base member and the co-operating insulated plug member are provided with three co-operating plug and socket contacts spaced symmetrically from one another so that the insulated plug member can be inserted either way round. Only the central contact and one outer contact in the insulated plug member are connected to the mains, the other outer contact being dead. The central contact in the base member is common to both voltage input circuits, while the two

outer contacts are respectively connected to the different voltage input circuits. Thus, by reversing the insulated plug end for end, connection may be made to one or other of the voltage input circuits as desired. In order to prevent the possibility of connecting the mains to the wrong input circuit of the set, the insulated plug member is formed with a recess intermediate the central and one of the outer contacts for the reception of a removable stud or obstructing member screwed into the base member in a corresponding position, thus determining one position of the insulated plug member. The base member is formed with a screw-threaded hole in a corresponding position at the other side of the central contact so that by removing the stud or obstructing member from one hole and inserting it into the other, the insulated plug member must be reversed before it can be inserted. Possibility of accidental short-circuits or wrong connections is obviated by suitably shrouding the respective contacts. Instead of using a removable stud or obstructing member upon the base member, the latter may be formed with a channel in one end or side wall of the elongated recess and the insulated plug member is formed with screw-threaded holes at opposite ends or in corresponding positions at the opposite sides for the alternative reception of a screw, such screw serving to prevent the insertion of the insulated plug member except in the right position. In a further alternative construction, a rib may be provided at a suitable position on the wall of the elongated recess in the base member and the insulated plug member is formed with corresponding recesses at opposite sides or ends, one of such recesses being obstructed by means such as a screw so that by changing the position of the screw, the correct position for the insertion of the insulated plug member is determined.

It will be understood that in all the constructions hereinbefore described the positions of the respective plug and socket contacts may be reversed; that is to say, instead of providing plug contacts in the base member and sockets in the insulated plug member, the plug contacts may be provided in the latter and the socket contacts in the base member. Furthermore, the plug and socket contacts may be used in any suitable combination in the base member. Thus, in the case where the three contact members in the base member are symmetrically spaced, the common contact may be in the form of a socket, while the two outer contacts may be in

the form of plugs or vice versa. Furthermore, provision may be made in any of the constructions described, for the insertion of fuses in one or both leads, 5 either on the set member or on the mains-connected member.

Obviously, the invention may also be applied to three or more different mains

voltages by increasing the number of contacts and arranging that only one pair can be connected at a time. 10

Dated this 21st day of March, 1930.
F. J. CLEVELAND & Co.,
29, Southampton Buildings,
Chancery Lane, London, W.C.2.,
Agents for the Applicants.

COMPLETE SPECIFICATION.

Improvements in or relating to Plug and Socket Devices for Connecting Mains-operated Wireless Sets and the like to Mains.

We, BELLING & LEE, LIMITED, a Company incorporated according to British Law, of Queensway Works, 15 Ponders End, in the County of Middlesex, and EDGAR MORTON LEE, a British Subject, of the same address, do hereby declare the nature of this invention and in what manner the same is to be per- 20 formed, to be particularly described and ascertained in and by the following statement:—

This invention relates to plug and socket devices for use in connection 25 with electrical apparatus and in particular, mains-operated wireless sets and the like of the kind in which provision is made for alternative use of the apparatus or set with either of two or more mains voltages. The invention has for its 30 principal object to provide an improved construction of plug and socket device for connecting such sets to the mains whereby the possibility of inserting 35 the plug so that high voltage mains are connected to the lower voltage input circuit of the set, and vice versa, is obviated.

According to the present invention, 40 the respective part of the plug and socket device connected to the set is provided with three contact members one of which is common to both high and low voltage input circuits, while the other two contact members are connected to the 45 respective different voltage circuits, and the co-operating part of the device connected to the mains is provided with two contact members adapted to engage respectively with the common contact 50 member and with one of the different voltage contact members in the other part, one or both of the parts of the plug and socket device being constructed so that structural alteration or adjustment 55 involving the change in position of a plug or socket, screw or other component part of the device, is necessary to enable the part connected to the mains to be

applied to the part connected to the set so as to establish connection with the other of the different voltage contact 60 members.

The invention is hereinafter described by way of example with reference to the accompanying diagrammatic drawing, in 65 which:—

Figure 1 is a longitudinal section of a plug and socket coupling device in accordance with the invention, the plug member being shown withdrawn from the 70 socket member;

Figure 2 is a part cross-sectional view corresponding to Figure 1, but with the plug and socket members engaged;

Figures 3 and 4 are views similar to 75 Figure 1, illustrating modifications; and

Figures 5 and 6 are plan views illustrating further modifications.

In carrying the invention into effect according to one construction and with reference to Figures 1 and 2 of the accompanying diagrammatic drawing, the improved plug and socket connecting device comprises an elongated base member 1 of insulating material formed with a longitudinal recess 1a open at the top or at one side of the base member, the bottom 1b or opposite side being formed with holes for the reception of three plug contact members 2, 3, 4, the contact portions of which are accommodated in the recess 1a in the base member and are thereby shrouded. At each end the base member 1 may be formed with extended portions preferably rounded off at the extremities and formed with holes 1c extending through the base member 1 so that the base member may be fixed so as to project from the outer face of a panel or behind a panel, in which case the panel is formed with a slot coinciding with the longitudinal recess 1a in the base member 1. Alternatively, or in addition, holes may be provided so that 100 105

the base member may be fixed upon a base board with the contact plugs 2, 3, 4, horizontally disposed. One of the three contact members 2, 3, 4, conveniently the member 2 at one end, is common to both the voltage input circuits of the set, while the remaining two terminals 3, 4 are connected respectively to the different voltage circuits.

For co-operation with the base member 1, an insulated plug member 5 is provided shaped to fit into the elongated recess 1a in the base member 1. The insulated plug member 5 conveniently is split in a longitudinal plane along the major axis of its cross-section, the two parts 5, 5a being held together by means of a screw 6 or screws and being formed with an inlet passage 7 for the flex connected to the mains, such inlet passage communicating with branch passages 8, 9, 10 leading to three parallel disposed recesses 8a, 9a, 10a corresponding in position to the three plug contacts 2, 3, 4 in the base member, such parallel recesses 8a, 9a, 10a being adapted for the reception of metal sockets 11, 12, for engaging the plug contacts 2, 3, 4. Only two such sockets 11, 12 are provided, one socket 11 being disposed permanently in the recess 8a at one end of the insulated plug member 5, while the other socket 12 is inserted as desired into one or other of the remaining recesses 9a, 10a according to the mains voltage with which the set is to be used. It will be appreciated that once the variable metal socket 12 is inserted into the correct recess 9a or 10a and the two halves 5, 5a of the insulated plug member are screwed together, it is impossible to connect the mains to the wrong voltage input circuit of the set. In order to prevent the insulated plug member 5 from being turned round end to end and inserted so as possibly to make the wrong connection, the three plug contacts 2, 3, 4 in the base member 1 are unequally spaced from one another. Alternatively, the contact members may be equally spaced and the elongated recess in the base member may be formed, for instance as shown in Figures 4, 5 or 6, with a recess or a projection co-operating with a corresponding recess or projection upon or in the insulated plug member, the co-operating recess or projection being so arranged that the insulating plug member cannot be inserted the wrong way round.

In an alternative construction, as illustrated in Figure 3, the base member 1 is provided with three symmetrically spaced terminals 2a, 3a, 4a, the centre terminal 2a being common to the two voltage circuits. The centre terminal 2a

is provided or formed with a plug contact 2 projecting into the recess 1a in the base member 1, while the two outer terminals 3a, 4a, are formed with screw-threaded sockets 3b, 4b or the like adapted for the alternative reception of a plug contact member 13 having a screw-threaded base portion 13a. For use with this construction of base member 1, a two-pin socket coupling 5 of ordinary construction may be employed, it being obvious that once the position of the movable plug contact 13 has been determined, the two-pin socket coupling 5 cannot be inserted to make connection with the wrong input circuit, the conducting sockets 11, 12 in such plug member being suitably shrouded so that there is no possibility of contact with the screwed socket; for instance 3b, of the idle terminal in the base member 1.

In a further alternative construction, as illustrated in Figure 4, both the base member 1 and the co-operating insulated plug member 5 are provided with three co-operating plug and socket contacts 2, 3, 4 and 11, 12, 12a spaced symmetrically from one another so that the insulated plug member 5 can be inserted either way round. Only the central contact 11 and one outer contact 12 in the insulated plug member 5 are connected to the mains, the other outer contact 12a being dead. The central contact 2 in the base member 1 is common to both voltage input circuits, while the two outer contacts 3, 4 are respectively connected to the different voltage input circuits. Thus, by reversing the insulated plug 5 end for end, connection may be made to one or other of the voltage input circuits as desired. In order to prevent the possibility of connecting the mains to the wrong input circuit of the set, the insulated plug member 5 is formed with a recess 5b intermediate the central contact 11 and one of the outer contacts 12 or 12a for the reception of a removable stud or obstructing member 14 screwed into the base member 1 in a corresponding position, thus determining one position of the insulated plug member 5. The base member 1 is formed with a screw-threaded hole 14a in a corresponding position at the other side of the central contact 2 so that by removing the stud or obstructing member 14 from one hole and inserting it into the other, the insulated plug member 5 must be reversed before it can be inserted. Possibility of accidental short-circuits or wrong connections is obviated by suitably shrouding the respective contacts. Instead of using a removable stud or obstructing member 14 upon the base member 1, the latter, as shown in Figure 6, may be formed with a

channel 1d in one end or side wall of the elongated recess 1a, and the insulated plug member 5 is formed with screw-threaded holes 5c, 5d at opposite ends or in corresponding positions at the opposite sides for the alternative reception of a screw 14, such screw 14 serving to prevent the insertion of the insulated plug member 5 except in the right position. In a further alternative construction, as shown in Figure 5, a rib 1e may be provided at a suitable position on the wall of the elongated recess 1a in the base member 1, and the insulated plug member 5 is formed with corresponding recesses 5e, 5f at opposite sides or ends, one or the other of such recesses being obstructed by means such as a screw 14 so that by changing the position of the screw 14, the correct position for the insertion of the insulated plug member 5 is determined.

It will be understood that in all the constructions hereinbefore described the positions of the respective plug and socket contacts may be reversed, that is to say, instead of providing plug contacts in the base member and sockets in the insulated plug member, the plug contacts may be provided in the latter and the socket contacts in the base member. Furthermore, the plug and socket contacts may be used in any suitable combination in the base member. Thus, in the case where the three contact members in the base member are symmetrically spaced, the common contact may be in the form of a socket, while the two outer contacts may be in the form of plugs or vice versa. Furthermore, provision may be made in any of the constructions described, for the insertion of fuses in one or both leads, either on the set member or on the mains-connected member.

Obviously, the invention may be also applied to three or more different mains voltages by increasing the number of contacts and arranging that only one pair can be connected at a time.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A plug and socket device for use in connection with electrical apparatus of the kind referred to, wherein the respective part of the plug and socket device connected to the set is provided with three contact members one of which is common to both high and low voltage input circuits, while the other two contact members are connected to the respective

different voltage circuits, and the co-operating part of the device connected to the mains is provided with two contact members adapted to engage respectively with the common contact member and with one of the different voltage contact members in the other part, one or both of the parts of the plug and socket device being constructed so that structural alteration or adjustment involving the change in position of a plug or socket, screw or other component part of the device, is necessary to enable the part connected to the mains to be applied to the part connected to the set so as to establish connection with the other of the different voltage contact members.

2. A plug and socket device as claimed in Claim 1, wherein the base member is provided with three permanent contact members and wherein the plug member is provided with two contact members one of which is of fixed location for co-operation with one of the contact members in the base member, while the other contact member in the plug member is adapted to be located alternatively in either of two positions for co-operation with the respective alternative voltage contact members in the base member.

3. A plug and socket device as claimed in Claim 2, wherein the plug member is split longitudinally to permit of changing the movable contact member from one position to the other, the two parts of the plug member being held together as by means of a screw.

4. A plug and socket device as claimed in Claim 1, wherein the base member is provided with three terminals, the terminal which is common to both voltages being provided or formed with a plug or other contact, while the remaining two terminals are formed with screw-threaded sockets or are otherwise adapted for the alternative reception of a second plug or other contact member, the three terminals being so arranged that in either position a two-pole plug member having sockets or other suitable contacts may be engaged with the respective pair of contact members in the base.

5. A plug and socket device as claimed in Claim 1, wherein the base member and the co-operating insulated plug member are provided with three co-operating plug and socket contacts symmetrically arranged so that the plug member can be inserted either way round, and wherein the plug member or the base member is provided with an obstructing member adapted to be inserted or applied at either of two positions, the other member of the coupling being so formed that the obstructing member will prevent the

65

70

75

80

85

90

95

100

105

110

115

120

125

insertion of the insulated plug member into the base member in the wrong voltage position.

6. The improved plug and socket connecting device, substantially as hereinbefore described with reference to Figures 1 and 2 of the accompanying diagrammatic drawing.

7. The improved plug and socket connecting device, substantially as hereinbefore described with reference to Figure 3 of the accompanying diagrammatic drawing.

8. The improved plug and socket connecting device, substantially as hereinbefore described with reference to Figure 4 of the accompanying diagrammatic drawing.

9. The improved plug and socket connecting device, substantially as hereinbefore described with reference to Figure 5 of the accompanying diagrammatic drawing. 20

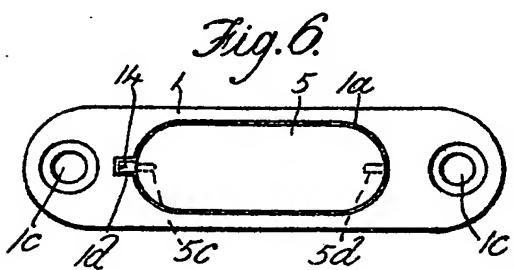
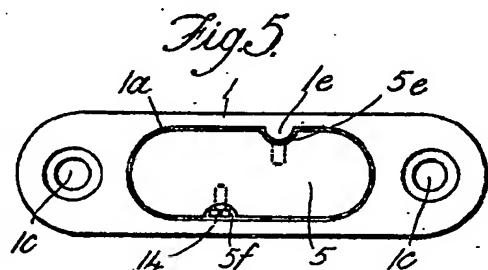
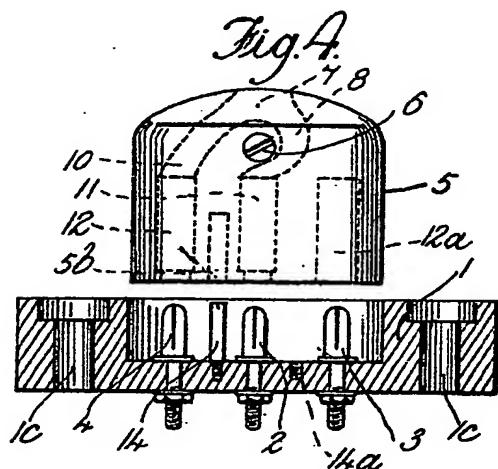
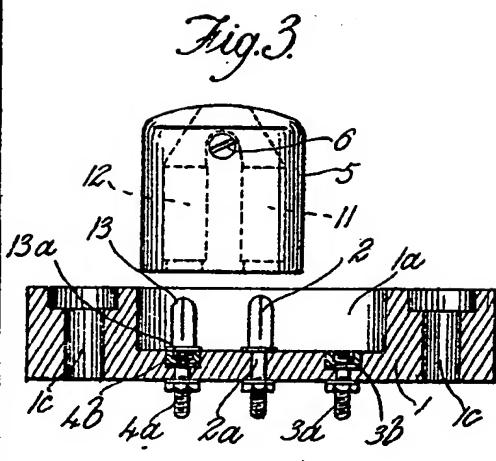
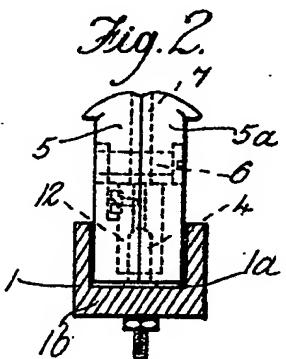
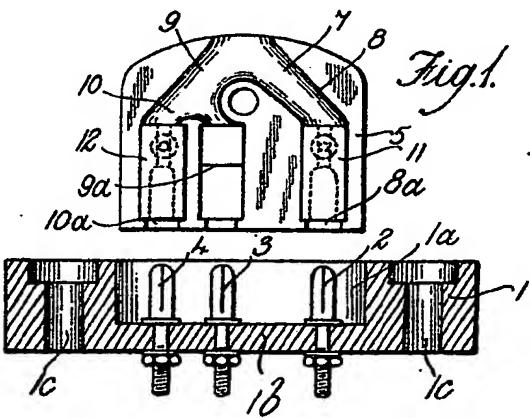
10. The improved plug and socket connecting device, substantially as hereinbefore described with reference to Figure 6 of the accompanying diagrammatic drawing. 25

Dated this 7th day of November, 1930.

F. J. CLEVELAND & Co.,
29, Southampton Buildings,
Chancery Lane, London, W.C.2.,
Agents for the Applicants.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcolmson, Ltd.—1931.

[This Drawing is a reproduction of the Original on a reduced scale]



THIS PAGE BLANK (USPTO)